2.0 DESCRIPTION OF ALTERNATIVES, INCLUDING PROPOSED ACTION

2.1 INTRODUCTION

This chapter presents the Proposed Action (Alternative A) to conduct a 3-D geophysical survey in the proposed project area as well as a No Action Alternative (Alternative B). Other alternatives are presented that were considered but dismissed from further consideration because they would not meet the purpose and need of the project.

2.2 ALTERNATIVE A - PROPOSED ACTION

Dawson proposes to conduct a 3-D seismic survey encompassing approximately 80 mi^2 of BLM, SITLA, and private lands in Uintah County, Utah. The proposed project would occur in T8S-T10S, R22E-R24E. The exploration would involve drilling, shooting, and recording within the 80-mi^2 proposed project area that includes BLM (88%), SITLA (11%), and private (1%) surface (see Figure 1.1). Dawson would obtain authorization from two surface management agencies (SMAs)--BLM and SITLA--as well as private landowners prior to project initiation. In addition, Dawson would apply for a permit to conduct seismic exploration in Utah from the Utah Department of Natural Resources, Division of Oil, Gas, and Mining.

2.2.1 Surveying, Drilling, Shooting, and Recording

2.2.1.1 Surveying

A survey crew would locate all source and receiver points using a global positioning system (GPS), and place pinflags and flagging on all such locations. Source points are the locations along 63 parallel source lines (336.44 mi total length) where shot holes would be drilled and detonated or where vibroseis buggies would be used to generate low frequency sound waves into the geological formations (see Figure 1.2). The source lines would be spaced at intervals of 1,760 ft (in a north-south direction), and the source points would be spaced at intervals of approximately 311 ft along the source lines for a total of 5,711 source points. Approximately 15% of the source points would utilize shot holes and 85% would utilize vibroseis buggies to generate sound waves.

Receiver points are the locations along 62 parallel receiver lines (483.75 mi) where receivers (geophones) would be placed to detect reflected sound waves generated by vibroseis buggies or detonated explosives in shot holes, and transmit them to the recording equipment. Receiver points would be spaced at intervals of approximately 220 ft along the 62 receiver lines for a total of 11,609 receiver points. The receiver lines would be spaced at intervals of 880 ft.

The location of source and receiver lines may vary slightly from those depicted in Figure 1.2 to facilitate access or to avoid environmentally sensitive areas. No dozing would occur, and no other types of heavy equipment would be used for removing or clearing vegetation. The 63 source lines would cross the proposed project area in a northeast-southwest direction, whereas the 62 receiver lines would cross the proposed project area in a north-south direction.

An archaeologist approved by the applicable SMA would identify and flag all archaeological sites 50 ft on either side of the centerline of the source lines (for vibroseis buggies or buggy-mounted drilling) or within a 50-ft radius (for heli--portable drilling) of proposed shot holes. If an access route or source point occurs within an archaeological site, the route or source point would be relocated and the archaeological site flagged for avoidance. Special status species inventories and clearances would also be conducted, as necessary, and avoidance areas flagged and mapped prior to any surface disturbance. Paleontological localities would also be identified and avoided. Seismic exploration could begin after approval of these surveys (including Section 106 compliance process for cultural resources [36 C.F.R. 800]) by the appropriate SMA, as well as determination of appropriate avoidance/mitigation and notification of the appropriate SMA.

All-terrain vehicles (ATVs) would be used, wherever practicable, for transportation and scouting for buggy-mounted drill crews.

2.2.1.2 Drilling

Shot holes would be drilled using buggy-mounted drills (Figure 2.1) equipped with large-diameter balloon tires to minimize disturbance to soils and vegetation. In some instances heli--portable drills (Figure 2.2) may be used to drill in areas too steep (slopes in excess of 40%) for buggy-mounted drills.

Figure 2.1 Buggy-Mounted Drill.

Figure 2.2 Heli-portable Drill.

Drilling would generally use air-drilling technology with the exception of some locations in valley bottoms. Drill holes would be backfilled and plugged after being loaded as per Utah Division of Oil, Gas, and Mining regulations. Any holes drilled through water-bearing zones would be filled with bentonite to a point above the water zone. Any cuttings resulting from drilling the shot hole would be used to backfill the shot hole, and any extra cuttings would be raked and spread on the surface. Water may be required for drilling if loose, unconsolidated rock is encountered. It is estimated that no more than 0.25 acre-ft of water would be required for all drilling on the proposed project. The water would be obtained from the Vernal municipal water supply and transported to the drill site using a water truck/buggy, or, if used in heli--portable drilling, transported via heli--copter.

Shot holes would be 40 ft deep and approximately 3.5-5.0 inches in diameter. The charge would consist of 10 pounds of Dynoseis (Appendix C), and would be placed in the bottom of the shot hole immediately after drilling. The shot hole would be plugged in accordance with State of Utah regulations and marked with lath.

In some instances, a truck carrying explosives or a drill support pickup truck would use the same routes as the vibroseis buggies and buggy-mounted drills. Existing routes would be used whenever possible to minimize off-road travel.

2.2.1.3 Shooting and Recording

After completion of drilling, a recording crew would lay out the cables and geophones required to record the reflected sound waves generated by the vibroseis buggies (Figure 2.3) and shots. Geophones would be placed on the surface by hand at intervals of approximately 220 ft using a helicopter, light duty pickup truck, or ATV to deliver the equipment. Pickup trucks would be used on existing roads and trails, and ATVs would be used when in compliance with casual use. After the cables and geophones are laid out, vibroseis buggies would be activated (or the explosives in the shot holes would be detonated) one source point at a time in a sequential manner and the data collected at the receiver points by the geophones and recorded for subsequent geological interpretation. During the recording phase a minimum of 20 lines of recording equipment, 96 stations in length, would be active at any given time and would occupy an area of approximately 10.0 mi^2 (2.5 mi x 4.0 mi). Three vibroseis buggies would be operated simultaneously for about 2 minutes at a source point, after which the three buggies would move to a new source point in a "V" formation. Each vibroseis buggy would lower a metal plate approximately 4 ft X 7 ft (28.4 ft^2) to

Figure 2.3 Vibroseis Buggy.

ground surface, after which low-frequency sound waves would be transmitted through the ground and into subsurface formations. Two groups of three vibroseis buggies each would be used during recording phase of the project. Approximately 70-80 source points could be recorded in one day, depending upon terrain. Finally, the cables and geophones would be picked up in the same manner as they were laid out. No wheeled vehicles would be used in areas drilled with heli--portable equipment--all activity in those areas would be accomplished by heli--copter or on foot.

ATVs would be used, wherever practicable, for transportation, scouting, and trouble-shooting by recording crews.

2.2.2 Access and Staging Areas

Vehicular traffic would be limited to a 30-ft wide corridor and designated access routes as well as a larger radius around the shot hole to allow the drill operator to maneuver into position as necessary. All of these areas would be cleared for cultural resources, federally listed TEPC species, and BLM SS species. The approximately 120 mi of existing roads and trails in the proposed project area would be used to the extent

practicable for access to the area and to the source and receiver lines. Buggy-mounted drills and vibroseis buggies would be limited to one track, when practicable, along source lines to minimize damage to vegetation unless otherwise directed by the appropriate SMA. Access to steeper areas would be from the side with the least amount of slope in order to avoid damage to soils and vegetation. Buggy-mounted drills and vibroseis buggies would be restricted to designated access routes, including source lines and existing roads and trails that have been cleared for cultural resources and other sensitive resources.

Two storage areas and up to six crew-staging areas would be required. Typically, one primary staging area is used with several smaller staging areas located in various quadrants of the project. In addition, heli--portable operations may require several small staging areas in remote locations. Staging areas would be located on disturbed deeded land if possible. If staging areas would occur on federal surface they would be cleared for archaeological and biological resources prior to use. Staging areas would not be bladed, leveled, or otherwise disturbed except by vehicle activity. Staging areas on federal surface would be identified by Dawson and approved by the BLM prior to use. Staging and storage areas would occupy approximately 1.0-1.5 acres each, and would be used to park crew vehicles, fuel trucks, the drill heli--copter, trailers used to transport equipment to the site, and miscellaneous support equipment required for project completion. Staging areas would also be used to bag and prepare recording equipment to be flown to receiver lines. A coordinator's truck, usually at the staging area, would direct the helicopter to areas where equipment pickup or delivery would be required. Explosives would be stored and secured according to U.S. Bureau of Alcohol, Tobacco, and Firearms regulations (27 C.F.R. Part 55, Subsection K).

2.2.3 Schedule and Work Force

The workforce would include a survey crew of 10 workers; up to two helicopters for surveying, drilling, recording, and support; and three to five buggy-mounted drill crews. Each drilling crew would consist of two to three workers. One buggy crew could drill approximately 10-15 shot holes per day. The heli-portable drills could drill 5-6 holes per day. Six vibroseis buggies would be used--two sets of three buggies each. The workforce would also include support personnel such as supervisors and workers specializing in setting explosives and in safety. The recording crew would consist of 45-55 workers, and approximately 60 days would be required for recording. One helicopter would likely be used during recording. Surveying would begin in early to mid-June, 2004, with project completion anticipated by fall or early winter 2004. No drilling or recording would occur until this EA is completed and a *Notice to Proceed* issued by BLM, which is anticipated by about September 1, 2004. The exact routes that would

be flown during heli-portable drilling cannot be predicted at this time because the precise order of drilling shot holes has yet to be determined.

2.2.4 Reclamation

No reclamation is proposed other than backfilling the drill holes with cuttings and hand-raking out tracks along source lines. However, if any unanticipated surface disturbance does occur, Dawson would complete appropriate reclamation at the discretion of the applicable SMA.

2.2.5 Surface Disturbance

Travel along each source line would be restricted an approximately 30-ft wide corridor for buggy-mounted drills and vibroseis buggies; however, the entire corridor would not be disturbed. When used by a group of three vibroseis buggies traveling in a "V" formation, the disturbed area would be approximately 12 ft (three sets of two tire tracks, each tire track being 2 ft wide). In most cases, one pass would occur along any given corridor because of the number of roads in the project area that would provide access to the corridors and provide access to the vibroseis buggies for refueling and maintenance. Assuming that 85% of the source lines would utilize vibroseis buggies, total disturbance would be approximately 416 acres.

When buggy-mounted drills were used on the source lines, a disturbance area of approximately 6 ft would occur. Assuming that 15% of the source lines would utilize buggy-mounted drills, total disturbance would be approximately 37 acres. As with vibroseis buggies, refueling and maintenance would usually occur where a corridor crossed an existing road, and one pass only would occur.

There would be instances when a refueling truck or maintenance crew would need to drive a source line corridor. This could occur on 20% of the length of the corridors (67 mi), disturbing an additional 32.5 acres (4-ft wide disturbance area).

The small number of heli-portable drill holes would add little to the disturbance because each heli-portable shot hole would disturb a maximum of 13 ft^2 (assuming a disturbance area approximately 4 ft in diameter). If 5% of the holes would be drilled by heli-portable drills, disturbance would be approximately 0.09 acre, and would take the place of disturbance by buggy-mounted drills of vibroseis buggies, both of which would cause more disturbance than would heli-portable drilling.

Total surface disturbance would be approximately 37 acres from buggy-mounted drills, 416 acres from vibroseis buggies, 32.5 acres from refueling and maintenance trucks, and 7.5 acres from staging areas (see Section 2.1.2), for a total of approximately 493 acres.

2.2.6 Applicant-committed Environmental Protection Measures

The following applicant-committed environmental protection measures would be applied to all lands, both federal and state.

2.2.6.1 Seismic Operations

In the event that geophysical operations are postponed or suspended for a period of time longer than two weeks, the operator will notify BLM at least forty-eight (48) hours in advance of resuming operations.

Heli-portable drills would be used in terrain too steep (slopes in excess of 40%) and rough for access by buggy-mounted drills or vibroseis buggies, or areas where ATVs are prohibited.

After being loaded, shot holes would be backfilled and plugged in accordance with the State of Utah Division of Oil, Gas, and Mining regulations, which are accepted by the BLM. Shot holes drilled through water-bearing zones would be filled with bentonite to a point above the water-bearing zone. Any drill cuttings not used in backfilling the shot hole would be scattered about the immediate area.

Vehicles traveling along seismic lines, where buggy-mounted drills or vibroseis buggies would be used, would be limited to a 30-ft wide corridor. However, the entire corridor would not be disturbed (see Section 2.2.5). All vehicles would be instructed to travel at slow speeds.

All vehicles and construction equipment would be properly maintained to minimize exhaust emissions and would be properly muffled to minimize noise. All ATVs would be equipped with spark arresters. All four-wheel drive buggies would be diesel powered. All vehicles would be equipped with fire extinguishers and shovels. When a helicopter is on location, it would be equipped with a water bucket. Dawson would coordinate project activities with the VFO Fire Dispatch at (435)-781-2071.

All trash, flagging, stakes, and cap leads would be collected and disposed of at an approved sanitary landfill. No potentially harmful materials or substances would be left on or near the seismic lines.

Dawson would maintain a safe operating buffer between shot holes and existing facilities in accordance with accepted industry standards (based on peak particle velocities) shown in Table 2.1.

Dawson would be responsible for keeping fences up and gates closed. Gates would be used for crossing fences whenever practicable. If a fence must be crossed at a location other than an existing gate, the fence would be cut and H-braces installed to support the existing fence. If livestock are present, a temporary gate would be installed to prevent livestock movement through the fence. Any temporary openings would be permanently wired shut and the wires stretched to their original tension.

Any facilities damaged, destroyed, or removed because of geophysical exploration would be immediately repaired or restored to original condition or replaced with a similar facility.

Dawson would post signs at locations along roads entering the proposed project area to alert people that seismic operations would be occurring. Dates of operations occurring and more specifics as to the area of impact would be included on the signs.

Table 2.1 Distance from Shot Holes to Various Objects.[1]

	Size of Charge (lbs) and Setback Distance (ft)					
Object	1	5	6-10	11-15	20-35	40-50
Pipeline <6 inches diameter	--	120	140	230	280	340
Pipeline 6-12 inches diameter	--	165	250	340	420	510
Pipeline >12 inches diameter	--	240	350	460	540	680
Telephone line	--	50	67	91	96	138
Railroad track or paved highway	--	180	260	340	220	520
Electric power line	--	300	300	300	300	300
Oil well, water well, building with foundations, spring, or underground cistern	200	500	700	850	1,320	1,550

[1] Accepted Industry Standards Based on Peak Particle Velocities. Exceptions to these distances may occur with the written permission of the facility owner or SMA.

Dawson would provide personnel around areas to be detonated to keep an adequate safety zone between the area to be detonated and any individuals or vehicles. This would ensure that no injury or property damage would occur. Dawson's personnel and their contractors would stay at least 75 ft away from shot holes being detonated. Other people would be kept at least 300 ft away from shot holes being detonated. Personnel would be posted to ensure that no one unknowingly drives into an area being detonated.

Dawson would require their personnel and subcontractors to wear hunter orange during the hunting seasons as a safety precaution.

In order to minimize impacts to the environment from personnel involved in the project, Dawson's employees and contractors would be subject to the following requirements: no firearms are permitted to be carried; no harassing or shooting of wildlife; no trash left in any unauthorized location; no unnecessary off-road driving; and no collecting of plants.

2.2.6.2 Cultural Resources

All eligible prehistoric or historic archaeological sites and properties found within the proposed project area would be avoided.

If an archaeological site and/or property is found at any time on BLM-administered lands during the project, all surface-disturbing work at such site would immediately cease and the BLM contacted. Any further work on that site would not resume until and unless authorized by the BLM.

Workers would be instructed to leave undisturbed and uncollected any artifacts they may discover.

Any receiver lines that would be used for access by buggy-mounted drills or vibroseis buggies, as well as any other cross-country access routes for buggy-mounted drills, vibroseis buggies, or pickups, would be subject to a Class III inventory.

No vehicle used in geophysical operations, including ATVs, pickup trucks, service trucks, buggy-mounted drills, and vibroseis buggies would depart from any road that traverses an area where cultural resources have been identified.

Before commencing with recording operations, edges of roads within cultural resource sites would be clearly identified with flagging, fences, lath, or other visible markers.

No shot holes would be drilled on any road segments located within the boundaries of a cultural resource site.

Avoidance of significant cultural sites not located near or across existing roads would be achieved by means of flagged cross-country site avoidance routes.

Source point locations and access routes would be revised to avoid all sites identified within the project's area of potential influence. Source points within sites would be moved outside site boundaries, and source points located immediately adjacent to sites would be moved further from the sites in order to provide a minimum buffer of 100 ft (30 m) between the site boundary and the project's area of potential influence. Source points would be moved 220, 440, or 660 ft north or south and/or 75 ft radially. Revised access routes marked with pink flagging tape would be placed around sites to separate the access route from the site area by at least 100 ft (30 m). Revised source point and access route locations would be inventoried. Barricades consisting of crossed laths with pink fluorescent flagging would be placed at the start and end of revised access routes to re-direct seismic traffic along the revised routes.

2.2.6.3 Invasive, Non-native Species (Noxious Weeds)

Dawson would power wash all equipment prior to entering the proposed project area to remove soils and mud and reduce the potential for introduction of invasive weeds from outside the project area.

2.2.6.4 Paleontology

If any vertebrate fossil sites are discovered during project activities on BLM-administered lands, those activities at such sites that would disturb those vertebrate fossils would immediately cease and the BLM would be contacted. Project-related activities at such sites would not begin until authorized by the BLM. Any collection of fossils or other mitigation would be at the expense of Dawson.

2.2.6.5 Soils, Vegetation, Riparian, Floodplains

Vibroseis buggies on source lines would travel in a "V" formation to minimize repetitive damage to soils and vegetation. No dozing would occur, and no other types of heavy equipment would be used for removing or clearing vegetation. In areas of pinyon, juniper, or other trees, the operator would avoid damaging or cutting trees to the extent practicable. Large trees would be avoided to the extent practicable. All vehicle drivers would be instructed to travel at slow speeds to limit disturbance to soils and vegetation. No vehicles would be operated during periods of saturated soil conditions when surface ruts deeper than 4 inches would occur along straight travel routes.

Dawson would not take vehicles on or within 300 ft of a wetland or riparian area except on existing roads or as otherwise approved by the landowner. No drilling or shooting would occur within 500 ft of any flowing stream.

Where determined to be necessary by BLM or the appropriate landowner, Dawson would rake out vehicle tracks visible from existing roads or trails to disguise the seismic lines and discourage use by off-road vehicles (ORVs). All such vehicle track depressions/ruts would be raked out to approximate the original contour.

All compacted areas (areas compressed and hardened by the weight of vehicle tracks) would be scarified (the breaking up of the compaction) to improve water filtration, reduce surface runoff, provide a seedbed for the establishment of vegetation, and discourage subsequent ORV use. All scarified areas would be reseeded with a mix of native and non-intrusive, non-native plant seed species on a site-specific basis as determined by the appropriate SMA.

Dawson would install hand-constructed water bars along seismic lines where necessary, as determined by the appropriate SMA.

Biological soils crusts (about 10% of the disturbed track area) would be raked into the tracks from the sides when the tracks disturb biological soil crusts, as determined by the appropriate SMA.

When geophysical operations are complete, signs and barricades would be placed in appropriate areas as deemed necessary by the appropriate SMA to discourage the use of seismic lines for ATV travel.

2.2.6.6 Threatened, Endangered, Proposed, and Candidate (TEPC) and Special Status (SS) Plant and Animal Species

Greater Sage-grouse. No drilling would occur and no explosives would be detonated within greater sage-grouse nesting habitat (suitable habitat within 2.0 mi of an active lek) during the breeding and nesting season of March 1 to June 15 unless an exception is granted by the applicable SMA.

Mexican Spotted Owl. If seismic exploration is delayed until the spring and/or summer seasons, no drilling, detonation of explosives, or recording would occur from March 1 through August 31 in potential Mexican spotted owl nesting habitat or within 0.5 mi of potential Mexican spotted owl nesting habitat until breeding surveys are completed to determine the presence or absence of breeding owls. Current U.S. Fish and Wildlife Service (USFWS) protocols would be followed.

Mitigation measures identified for soils would be applied along the length of all source lines occurring in potential Mexican spotted owl habitat. These mitigation measures should minimize potential impacts by minimizing the potential for source lines to subsequently be used as for ORV travel.

2.2.6.7 Wildlife/Raptors

No drilling/recording would occur within 0.5 mi of an active raptor nest (1.0 mi for an active peregrine falcon nest) during the mating/nesting season in accordance with accepted raptor protection dates (Table 2.2). If drilling/recording are proposed for any line on BLM-administered lands during the raptor mating/nesting season, a BLM biologist or a qualified biologist acceptable to BLM would survey the area 0.5 mi on each side of the line(s) where drilling/recording would occur prior to any surface disturbing activities to determine whether active raptor nests were present.

2.3 ALTERNATIVE B - NO ACTION

Under the No Action Alternative, the proposed project would not be authorized on BLM lands, and all other current land uses and resource trends would continue.

Table 2.2 Raptor Protection Dates for Mating/Nesting (from the Diamond Mountain RMP [BLM 1993]). [1]

Raptor	Seasonal Buffer
Golden eagle	February 1-July 15
Bald eagle	January 1-August 15 (November 1-March 15 for winter roost areas)
Peregrine falcon	February 1-August 31
Great horned owl	February 1-May 15
Ferruginous hawk	March 1-July 15
Long-eared owl	March 15-June 15
Red-tailed hawk, Swainson's hawk, Harrier, prairie falcon, and osprey	April 1-July 15
Burrowing owl	April 1-August 15
Mexican spotted owl	March 1-August 31
Goshawk	April 15-August 20
Merlin	April 15-June 25
Short-eared owl	April 10-June 15
Kestrel	May 1-June 30
Cooper's Hawk	May 1-August 15
Turkey vulture	May 15-August 15
Sharp-shinned hawk	June 20-August 15

[1] These seasonal buffers have been developed over years of input and coordination with the Utah Division of Wildlife Resources (UDWR) and the U.S. Fish and Wildlife Service (USFWS).

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

In accordance with 40 C.F.R. 1502.14(a), BLM considered the following alternatives. However, after careful evaluation these alternatives were eliminated from further detailed analysis.

2.4.1 Use of 2-D Seismic Techniques

2-D seismic techniques are similar to 3-D seismic techniques. The principal difference is that in 2-D seismic the same line is used for both the source points and receiver points, whereas in 3-D seismic the source points and receiver points are located along different lines. 2-D seismic techniques do not give the same type and amount of data as 3-D seismic techniques, and would not provide the data required for the proposed project. Therefore, a 2-D seismic alternative is not considered further in this EA.

2.4.2 Use of Surface Shots as an Energy Source

The quality of data recorded from the reflection of energy signals generated from using surface shots is inferior to that recorded using shot hole explosives or vibroseis buggies. The use of surface shots was eliminated from further analysis because the method would not provide the quality of data necessary and would result in the same or greater environmental impacts, including an increased likelihood of wildfires.

2.4.3 Limit Seismic Exploration to Existing Roads and Vehicle Trails

Another alternative would be to limit seismic exploration to existing roads and trails. However, the 120 mi of roads and trails in the proposed project area would not allow for a sufficient number and distribution of source points to provide the data necessary to effectively define the area using seismic technology. The seismic survey should be acquired using the Proposed Action design. The Proposed Action is superior in that it maintains relatively high fold and wide azimuth and offset distribution across the entire survey area. Gathering the widest range of azimuths and offsets while maintaining high CMP fold is critical when considering the implications on the seismic data processing and interpretation requirements. An alternative limited to existing roads and trails is a poor option. Based on our experience in the area, this design would yield a poor quality 3D volume having little value as a subsurface mapping tool. The fold map generated from the roads only design indicates that approximately 65% of the data would be in the 6-9 fold range for the deeper targets, and even less at the shallower horizons. The low fold data would make the correlation of seismic reflectors across the survey area extremely difficult, which would lead to an ambiguous or incomplete interpretation. (The fold plots are available for review in the Administrative Record at the BLM Vernal Field Office.) Therefore, this alternative is not considered further in this EA.

2.4.4 Exclude the Proposed ACEC From the Project Area

This alternative would exclude from seismic exploration the approximately 7,147 acres of the proposed project area that is included in the proposed ACEC along the White River. This alternative was excluded from further analysis because it would not allow adequate data collection on the proposed project area and therefore would not meet the purpose and need for the proposed action. In addition, impacts from past seismic exploration in the area have been short-term and negligible to low, and would be expected to be the same in the proposed ACEC.